

3-1977

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Recommended Citation

Volding, Thomas and Boehlje, Michael, "An Economic Evaluation Of Cash And Accrual Accounting Methods For Farmers" (1977).
Economic Staff Paper Series. 133.
http://lib.dr.iastate.edu/econ_las_staffpapers/133

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Abstract

Tax management is an important consideration for the successful farm manager. There are many decisions that must be made in the development of a tax management plan. These decisions concern such items as depreciation methods, fiscal or calendar year, type of farm organization, inventory valuation methods, and income averaging.

Disciplines

Accounting | Agribusiness | Economic History | Economic Theory | Taxation

AN ECONOMIC EVALUATION
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No. 50

March, 1977

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INTRODUCTION

Tax management is an important consideration for the successful farm manager. There are many decisions that must be made in the development of a tax management plan. These decisions concern such items as depreciation methods, fiscal or calendar year, type of farm organization, inventory valuation methods, and income averaging [6].

The accounting method used by a farm business can have a significant impact on the tax liability. The two basic allowable accounting methods available to farmers are the cash method and the accrual method. The cash method allows expenses and income to be recorded in the year cash changes hands, regardless of when the expense or income was accrued. Under the accrual method, expenses and income are recorded in the year they accrue, regardless of when they are paid. The flexibility under the cash system allows prepayment of some expenses.^{1/} It also allows income to be changed by altering sales or postponing receipt of income. This flexibility allows the tax liability to be adjusted.

The basic problem confronting the farmer when he uses the cash method for reporting taxable income is how to adjust receipts and expenses in such a way that he maximizes his total after-tax income over a number of years.

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^{1/} Although the Tax Reform Act of 1976 limits the interest deduction to the amount accrued during the year, other cash expenses can still be deducted in the year they are paid. See [1].

When each year is considered by itself, a farmer would make these adjustments so that after-tax income is maximized each year without regard to the effects of this decision on taxable income in future years. However, when a multi-year planning horizon is considered, this maximization process involves the additional considerations of the effect on future year's taxable income from adjustments taken in the current year, and the time value of money. Money saved from taxes this year is preferred to the same amount of money saved in future years. Thus, the optimum level of cash deductions must be chosen to maximize after-tax income over time.

THE MODEL

To assist farmers in the choice of a tax accounting system and to evaluate the relative benefits of accrual compared to various cash systems for different enterprise types and sizes of farms, a multi-period growth model of the farm firm was developed. The objective of the analysis was to maximize the discounted after-tax income over a five year period through choice of an accounting system. Three accounting systems were compared for the various farm situations - 1) the accrual system, 2) the cash system with maximum cash adjustments, and 3) the cash system with optimal cash adjustments. Cash adjustments include expense items that are prepaid as well as income items that are postponed. With the accrual system, no opportunity exists to adjust taxable income through prepaid expenses or delayed sales. If the cash system with maximum adjustments is used, all possible sales are delayed and expenses prepaid in the earliest year feasible. Thus, taxable income may be zero or very low in some years because of these additional cash deductions. With the optimal adjustment cash accounting system, deductions and income are manipulated to equate annual marginal tax rates adjusted for the discount rate and future earnings on tax savings during

the five year planning horizon.

The model was used to analyze representative farms in Census Class II (\$20,000 to \$39,999 in sales) and Class 0 (\$100,000 or more in sales).

Enterprise types analyzed included cash grain, hog and beef feeding, dairy, beef cow-calf, beef feeding, and hog feeding farms. Each farm size within each enterprise class was analyzed giving a total of twelve sets of data. Initial data on asset and liability structure, farm income and taxable income and expense items for each of the twelve representative farms were obtained from Iowa Farm Business Association records for 1974. The data were state averages for each farm class and enterprise type. Financial consequences evaluated included taxable income and tax liability, after-tax income, consumption, change in net worth and growth rate.

RESULTS

An Example - The Class 0 Dairy Farm

The data for the Class 0 dairy farm will be used to illustrate the results of the empirical analysis. Table 1 shows the annual values for the tax and business analysis variables during the five year planning horizon using cash accounting with optimum cash adjustments.

The discounted after-tax income for year one is \$57,969. This value is \$19,443 higher than the discounted first year income for the accrual method, and \$5,668 lower than the first year figure for the cash method using maximum yearly adjustments. Some (but not all) of the cash adjustments are used the first year with the optimum cash system, leaving part of the first year cash adjustments for use in years two and three. In contrast, all of the adjustments are used in the first year with the maximum cash adjustment system. After-tax income values for years two, three, and four are higher for optimal adjustment cash accounting compared to

Table 1. Business and Tax Analysis Results for the Cash Accounting Method with Optimum Adjustments for the Class 0 Dairy Farm.

Analysis variable		Year				
		1	2	3	4	5
Tax	Additional cash deductions	\$43,927	\$46,137	\$43,237	\$26,606	\$ 1,279
Analysis	Taxable income	25,440	28,000	36,000	57,892	88,000
Results	Tax liability	6,179	7,100	10,340	21,183	37,980
Business	After-tax income ^{a/}	\$57,969	\$56,331	\$52,996	\$44,903	\$33,313
Analysis	Consumption ^{a/}	24,021	23,080	20,481	18,600	14,430
Results	Change in net worth	37,004	39,570	40,811	37,089	29,077
	Growth rate	0.0656	0.0658	0.0637	0.0544	0.0404

^{a/} After-tax income and consumption are discounted using a 9 percent discount rate.

the other two accounting systems.

The five year total business analysis results for the Class 0 dairy farm using the three different accounting systems are summarized in Table 2.

Table 2. Five Year Business Analysis Totals for Each Accounting Method for the Class 0 Dairy Farm

Analysis Variable	Accrual Method	Cash Method - Maximum Adjustments	Cash Method - Optimum Adjustments
After-tax Income ^{a/}	\$172,783	\$211,922	\$245,513
Consumptions ^{a/}	77,495	90,541	100,613
Change in Net Worth	123,398	154,191	183,551
Average Growth Rate	0.04	0.05	0.058

^{a/} After-tax income and consumption are discounted using a 9 percent discount rate

These results indicate that the cash method with optimum adjustments has a \$33,590 advantage in the five year total after-tax income over the cash method with maximum adjustments. It's advantage over the accrual method is \$72,730. The advantage of optimum adjustments compared to maximum adjustments and accrual accounting is \$29,361 and \$60,153 respectively when five year total change in net worth is considered. Similar relationships between the different accounting systems exist when comparing total consumption and growth rate.

Table 2 indicates the advantage of both variations of the cash method over the accrual method of accounting. to determine the relative advantage of these different accounting systems, the dollar amount of each variable listed in Table 2 for the cash system is divided by the dollar amount for the accrual method. These ratios are listed in Table 3.

Table 3. Relative Advantage of Cash Methods of Accounting Over the Accrual Accounting Method for the Class 0 Dairy Farm.

Analysis Variable	Cash Method- Maximum Adjustments	Cash Method- Optimum Adjustments
After-tax Income	1.227	1.381
Consumption	1.168	1.303
Change in Net Worth	1.250	1.487
Growth Rate	1.228	1.439

The data in this table indicates that the cash method with optimum adjustments has a 38.1 percent advantage over the accrual method when after-tax income is considered, and a 48.7 percent advantage in change in net worth. This is about double the advantage of the maximum adjustment accounting system compared to accrual accounting.

Selected Farm Sizes and Enterprise Types

Table 4 summarizes five year total dollar values for each farm size class and enterprise type for the business analysis variables using the three different accounting systems. For example, Table 4 indicates that the cash method with optimum adjustment allows a Class II grain farm to generate \$14,311 more discounted after-tax income over a five year period than if the accrual accounting method were used. The optimum adjustment method has a \$6,122 advantage over the maximum adjustment variation in Table 4 for after-tax income. Consumption (discounted) and change in net worth over a five year period can be increased by \$4,778 and \$13,320, respectively, if the Class II grain farm uses the cash method with optimum yearly additional cash adjustments rather than the accrual method.

In contrast, the advantage of cash accounting with optimal adjustments over the accrual method is \$192,259 in discounted after-tax income for Class 0 grain farms (Table 4). The cash method with optimum adjustments has a \$101,036 advantage over the maximum adjustments variation when five year total after-tax income is considered. A difference of \$162,773 in net worth accumulation and significantly higher consumption are also attributed to the cash -- optimum adjustments system compared to accrual accounting for the Class 0 grain farm.

Analysis of the data in Table 4 indicates that for all farm sizes and types, the cash method of accounting with optimum adjustments is preferable to the other two accounting systems. This method of accounting produces more five year total dollars for the business analysis variables of after-tax income, consumption, and change in net worth. It also results in a more rapid growth rate.

Table 4. Five Year Business Analysis Totals for Different Accounting Systems for Various Sizes and Enterprise Types.

Class	Dairy		Grain		Hog & Beef Feeding		Beef Cow Calf		Hog Feeding		Beef Feeding	
	0	II	0	II	0	II	0	II	0	II	0	II
<u>After Tax Income a/</u>												
Accrual	\$172,783	\$35,294	\$288,534	\$64,360	\$125,378	\$48,479	\$100,621	*	\$243,860	\$88,030	\$90,464	*
Cash with Maximum Adjustments	211,922	37,388	335,748	72,549	150,043	52,536	112,956	*	319,384	100,301	101,420	*
Cash with Optimum Adjustments	245,513	43,169	436,784	78,671	183,909	59,513	127,294	*	332,193	111,141	123,992	*
<u>Consumption a/</u>												
Accrual	77,495	31,671	101,410	41,350	61,695	36,065	42,333	*	101,185	49,208	50,059	*
Cash with Maximum Adjustments	90,541	32,368	131,815	44,088	69,916	37,417	57,555	*	126,358	53,337	53,710	*
Cash with Optimum Adjustments	100,613	34,293	165,480	46,128	81,204	39,743	62,334	*	130,627	56,946	61,233	*
<u>Change in Net Worth</u>												
Accrual	123,398	2,670	185,505	29,916	82,239	16,040	60,933	*	185,157	50,312	52,090	*
Cash with Maximum Adjustments	154,191	6,221	259,135	36,610	101,894	19,187	70,426	*	245,001	60,338	60,579	*
Cash with Optimum Adjustments	183,551	11,423	348,278	43,237	132,836	25,542	83,850	*	254,928	70,373	80,980	*

a/ The values in the table are discounted using a 9 percent discount rate.

* Values for these farms could not be determined because using the farm record data earned income was negative for all three accounting methods.

Farm Size and Enterprise Type Comparison

Farm Size - Table 5 summarizes the relative advantage of the optimal adjustments cash accounting system compared to accrual accounting for all farm sizes and enterprise types. Table 5 indicates that larger farms in each enterprise type receive a higher payoff from the cash method with optimum adjustments compared to their smaller counterparts when after-tax income is considered. One major reason for this is that larger farms have more earned income and consequently higher marginal tax rates. One dollar in additional cash adjustments saves more income from taxes when the marginal tax rate is higher.^{2/} A similar conclusion can be drawn about farm size and the advantage of the cash method-optimum adjustments when the remaining business variables-consumption, change in net worth, and growth rate - are studied since these variables are directly related to after-tax income.^{3/}

Enterprise type - The enterprise type which can obtain the most advantage from cash accounting can be determined from Table 5 by looking at the column for each farm size and for each business variable. For after-tax income, large grain farms (Class 0) make more advantageous use of the cash method with optimum adjustments than do other large enterprise types. The Class 0 enterprise types listed in order of most advantageous to least advantageous use of cash-optimal adjustment accounting when after-tax income is considered are: (1) grain farm, (2) hog and beef feeding farm, (3) beef feeding

^{2/} An example may aid in understanding. If a Class 0 farm is in a 50 percent marginal tax rate, one dollar of additional cash deductions will save 50¢ from taxes. If a Class II farm has a 14 percent marginal tax rate this same dollar in additional cash deductions saves only 14¢ from taxes.

^{3/} One exception is the hog feeding enterprise type. For this enterprise type, the smaller farms have a relative advantage in net worth and growth rate. This occurs because of the large impact of small marginal increases in income above consumption on relative net worth accumulation and growth rate.

farm, (4) dairy farm, (5) hog feeding farm, and (6) beef-cow calf farm.

Table 5. Relative Advantage of Cash Method-Optimum Adjustments for Each Farm Size and Type Compared to Accrual Accounting.

Size Class of Farm	Business Analysis Variable							
	After Tax Income		Consumption		Change in Net Worth		Growth Rate	
	II	0	II	0	II	0	II	0
Grain Farm	1.222	1.786	1.116	1.632	1.445	1.877	1.479	1.750
Hog and Beef Feeding Farm	1.228	1.467	1.102	1.316	1.592	1.615	1.562	1.583
Dairy Farm	1.223	1.381	1.083	1.303	2.443	1.487	2.500	1.439
Beef Cow- Calf Farm	*	1.265	*	1.166	*	1.376	*	1.356
Beef Feeding Farm	*	1.371	*	1.223	*	1.555	*	1.500
Hog Feeding Farm	1.263	1.362	1.157	1.291	1.399	1.377	1.330	1.350

* Ratios for Class II farms for these enterprise types can not be determined because earned income was negative.

A major explanation for this order is the difference in the amount of additional cash adjustments that can be manipulated. Grain farms have the potential for much higher cash adjustments because numerous expenses can be prepaid (seed, fertilizer, chemicals, etc.) and all production of grain can be held from sale. In contrast, while the beef cow-calf farm can also hold all of its production from sale, it has a much lower value of production than does the grain farm. A similar conclusion can be drawn for Class 0 farms when the remaining business variables-consumption, change in net worth, and growth rate are evaluated.

The same general order of enterprise types exist for Class II farms when all business variables are considered. However, the differences between enterprise types are not as great as with Class 0 farms because the taxable income is lower for Class II farms.

CONCLUSIONS

The results indicate that farms using the cash method of accounting and declaring cash deductions and delaying sales in an optimizing manner can significantly improve their financial position over a five year period compared to using the accrual accounting method. Larger (Class 0) farms within each enterprise type obtain more relative advantage from cash accounting than do their smaller (Class II) counterparts. One possible explanation for this result is that larger farms have higher earned incomes, and consequently higher marginal tax rates than do smaller farms. Thus, one dollar of additional cash deductions or adjustments saves more earned income from taxes for the larger farms than the smaller farms.

The relative advantage of the cash method with optimum cash adjustments by farm enterprise type was also determined using 1974 income data. When large (Class 0) farms are analyzed, the cash grain enterprise type obtains the most advantage from cash accounting. Possible explanations for these results are:

1. Cash grain farms can hold all their grain inventory from sale.
This greatly reduces the income reported for tax purposes.
2. The prices for grain in 1974 were high. This gives the inventory a larger value and would put the cash grain farm in a high marginal tax bracket if the grain was sold.

When the enterprise types within the smaller farm size (Class II) were compared, no enterprise type had a real relative advantage. The

smaller farms have lower marginal tax rates, and these lower rates tend to eliminate any relative advantage to a particular enterprise type.

Thus, the results from this study indicate that all farms can gain financial advantages if the cash accounting method with optimum cash adjustments is used. However, farms that have high earned income and can hold a high percentage of inventory from sale obtain the most benefit from cash accounting.

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